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FARM PRACTICE IN THE PRODUCTION OF HAY IN STEUBEN COUNTY, N. Y., AND WASHINGTON COUNTY, PA.

(A detailed study of the amount of labor required per acre and per ton for each operation, and the machinery charges per acre and per ton.)

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OBJECT AND SCOPE.

Since hay is very susceptible to damage by bad weather at harvest time, and often demands attention when other farm work is pressing, the problem of getting haying done with a minimum expenditure of time and labor is of great importance to the hay grower. The object of this bulletin is to present data that may help the farmer in solving this problem.

The figures on labor and other factors of production given in the following pages were obtained in a study of hay production made in 1915 on 52 farms in Steuben County, N. Y., and on 37 farms in Washington County, Pa. The methods used by hay growers are practically the same for both of these sections, so that results for each operation are comparable.[1]

FACTS BROUGHT OUT.

The total items of production, including labor, machinery charges, interest on hay land, taxes, and seed, averaged $5 per ton for the New York area and $6.10 for the Pennsylvania area, with an average yield of about one and a half tons per acre.

[1] Acknowledgment is due to Mr. Robert W. Meyer for valuable assistance in the collection of the data discussed in this bulletin.

It was found that the amount of man labor required to produce a ton of hay averaged 4.2 hours for the 52 farms studied in the New York and 5.23 hours for the 37 farms in the Pennsylvania area. The number of hours of horse labor is almost the same as the number of man hours, 4.22 per ton for New York and 5 for Pennsylvania.

About 36 per cent of all hay produced on the New York farms was sold, while but 17 per cent from the Pennsylvania area reached the market.

The average life of hay meadows was 3.66 years for the New York farms and 4.10 years for the Pennsylvania farms.

The average farm value of hay on December 1 for a period of 10 years (1906–1915) was $14.62 per ton for the New York farms and $15.14 for the Pennsylvania farms. With a yield of about one and a half tons per acre, there is an excess over cost of production of $9.62 per ton for the New York farms and $9.04 per ton for the Pennsylvania farms in the farm value of No. 1 hay, which indicates that under average conditions hay growing is a profitable farm enterprise in these areas.

DESCRIPTION OF AREAS STUDIED.

Steuben County, N. Y., is one of the more important hay-producing counties in the State. It ranks among the first 10 in total production, both of timothy alone and timothy and clover mixed hay.

In general the surface in this county is very uneven, being broken by a series of long, rather steep hills and moderately broad valleys. The important towns in most cases are connected by good pike roads, which are a great asset in marketing farm crops.

In Washington County, Pa., the hills are of slightly less elevation than those in the New York area, though the slopes are steeper. In the main, however, the topography is the same with reference to facility for making hay.

SIZE OF FARMS.

The average size of the farms studied in Pennsylvania was 171 acres; of the New York farms, 202 acres. (See Table II.) The tillable area per farm is about the same in each State, approximately 156 acres. On the New York farms 35 per cent of the tillable area is in hay, as compared to 26 per cent on the Pennsylvania farms. There is no apparent reason for this large difference in hay area. Washington County is close to the Pittsburgh market, where there is a constant demand for hay, while the hay from Steuben County must be shipped much farther to market—to Buffalo or New York City.

Table I, compiled from census figures (1910 report), gives statistics on the per cent of land in hay for both counties. The per cent of tillable area in hay for each county as a whole is lower than that for the farms where the records were taken. (Compare with Table II.)

TABLE I.—*Per cent of farm land in hay and amount of hay produced.*

(From 13th Census Report, 1910.)

Item	Steuben County, N. Y.	Washington County, Pa.	Item.	Steuben County, N. Y.	Washington County, Pa.
Land in farms (acres)	818,373	503,923	Per cent of improved land in tame and cultivated hay	30.8	20.2
Improved land in farms (acres)	599,303	432,001	Timothy alone	14.1	14.8
Per cent of farm land improved	73.2	85.6	Timothy and clover, mixed	16.1	5.0
Per cent of farm land in tame and cultivated hay	22.5	17.3	Production (in tons): Tame and cultivated hay	184,767	87,292
Timothy alone	10.3	12.7	Timothy alone	84,362	64,014
Timothy and clover, mixed	11.7	4.3	Timothy and clover, mixed	96,405	21,404

TABLE II.—*Size of farm and per cent of land in hay.*

Item.	52 farms in Steuben County, N. Y.	37 farms in Washington County, Pa.
Average size of farm (acres)	202.00	171.00
Tillable area (acres)	157.40	156.00
Per cent of farm land tillable	77.9	90.8
Land in hay (acres):		
Per cent of total farm land	27.2	24.1
Per cent of tillable land	35.2	26.5

AMOUNT OF HAY SOLD.

Four-fifths of the farms studied in the New York area and two-thirds of those studied in the Pennsylvania area sell more or less hay. As shown in Table III, almost half of the hay grown on the New York farms that sold hay is marketed, while only about one-third is sold by the Pennsylvania farms that grew for the market.

TABLE III.—*Amount of hay grown for market.*

Item.	Steuben County, N. Y.	Washington County, Pa.
Number of farms studied	52	37
Number of farms that sell hay	43	21
Per cent of hay sold by farms selling hay	44	30

LABOR RATE.

On these farms labor is usually at a premium during harvest time. In both regions the season in which first-class hay can be made is limited to about 10 working days. On nearly all of the farms in each section the farm owner works in the hay field, and in this study the owners' labor has been given the same value as that of hired help. The man-labor rate has been fixed at 20 cents an hour, which is what the farmer has to pay during the hay-making season. By assuming a single rate for all man labor and not allowing a higher rate for the

owner (though the latter, of course, is also a manager), the results obtained show the average labor requirements for each operation. Horse labor is fixed at 13 cents an hour.

LABOR CHARGES FOR DIFFERENT OPERATIONS.

SEEDING.

On all the farms studied it is customary either to sow timothy in the fall on wheat with clover following in the spring or to sow both in the spring with oats, using the grain drill. There is no charge for horse labor used, for when seeding is not done by the drill with grain it is done by hand, either broadcast or by the use of a mechanical seeder, and the seed is sufficiently covered by the spring thaw.

In the New York area wheelbarrow seeders are used on 17 out of the 52 farms and "hand" seeders on 13 farms. The other 22 farms sow grass seed and clover in the grain drill with oats. In Pennsylvania 11 farms use hand seeders and the rest seed broadcast by hand. (See Table IV.)

About the same amount of work can be done per day with each method of hand seeding, the average being 16.80 acres for the New York farms and 15.50 acres for the Pennsylvania farms. A man can seed by hand between $1\frac{1}{2}$ and $1\frac{3}{4}$ acres per hour. The cost of labor for seeding, spread over the life of the meadow, is 2 cents per ton per year in each State. There is a slight variation in the average life of the meadows.

TABLE IV.—*Cost of hand seeding.*

Item.	52 farms in Steuben County, N. Y.	37 farms in Washington County, Pa.
Number seeding by hand	30	37
Average life of meadow, including years used for pasture (years)	3.66	4.10
Seeded by hand (acres)	1,411	1,411
Tons produced	2,116	2,201
Hours of man labor:		
Per day	9.43	10.0
Per acre	.561	.643
Per ton	.374	.412
Amount seeded:		
Per day (acres)	16.80 (25.20 tons)	15.54 (24.24 tons)
Per hour (acres)	1.76 (2.67 tons)	1.55 (2.42 tons)
Cost of man labor (at 20 cents per hour):		
Per day	$1.88	$2.00
Per acre	.122	.128
Per hour	.075	.082
Cost per year during life of meadow and pasture:		
Per acre	.030	.031
Per ton	.020	.020

AMOUNT OF SEED GROWN.

The New York farmers visited sow 2.23 pounds less of timothy and 0.62 pound more of clover seed per acre than do the Pennsylvania farmers. The initial cost of seed is practically the same in

both areas, averaging in 1915 about $2.15 per acre and $1.41 per ton for the first crop of hay. (See Table V.)

The average life of the meadow, including years used for pasture, is 0.68 year longer for the Pennsylvania farms than for the New York farms. The cost of seed per ton per year of meadow life is 7 cents less for the Pennsylvania group than for the New York group.

The yield per acre has an important bearing on the seed cost per ton of hay. In the New York area, for example, where the lowest yield found on an individual farm was 1 ton per acre, and the highest 3 tons per acre, the seed cost per ton of hay is $0.62 for the 1-ton-per-acre farm, while the seed cost for the 3-ton-per-acre farm is only $0.20.

TABLE V.—*Cost of seed and amount sown in 1915.*

Item.	52 farms in Steuben County, N. Y.	37 farms in Washington County, Pa.
Amount of timothy sown, per acre:		
Pounds	8.27	10.50
Quarts	5.88	7.47
Cost of timothy seed, per acre, at $3.40 per bushel	$0.625	$0.793
Amount of clover sown, per acre:		
Pounds	9.71	9.09
Quarts	5.19	4.85
Cost of seed, per acre, at $9.25 per bushel	$1.496	$1.491
Cost of timothy and clover seed, per acre	$2.121	$2.194
Cost of seed per year during life of meadow:		
Per acre	$0.620	$0.535
Per ton	.414	.343

MOWING.

In the New York area the 5-foot mower is used almost exclusively. Only a few 6-foot mowers and no 7-foot mowers are used. In the Pennsylvania area the 6-foot mower predominates, though a few 7-foot machines are used. The hay cut per hour, however, is about the same for each State, averaging 1 ton. The acreage grown per farm in the New York group is about two-thirds more than the average per farm in the Pennsylvania group. In Pennsylvania, while a larger mower is used, the fields are smaller, which necessitates more waste time in mowing. Another factor that would tend to decrease the amount mowed per hour in Pennsylvania is that the surface is more broken. The hills are steeper in general than in New York, where the topography is more gently sloping. The cost per ton for labor for mowing is about 28 cents in each case. (See Table VI.)

TABLE VI.—*Cost of mowing.*

Item.	52 farms in Steuben County, N. Y.	37 farms in Washington County, Pa.
Amount produced per year (tons)	[a] 4,047	[b] 2,201
Yield per acre (tons)	1.50	1.56
Width of mower (feet)	5.14	5.92
Man labor:		
Hay mowed per day (tons)	[c] 13.410	[d] 16.400
Hay mowed per hour (tons)	[e] 1,604	[f] 1.685
Hours of labor—		
Per day	8.36	9.73
Per acre	.935	.925
Per ton	.622	.593
Cost of man labor, at 20 cents per hour—		
Per day	$1.67	$1.94
Per acre	$0.187	$0.185
Per ton	$0.124	$0.118
Horse labor:		
Hours of labor—		
Per day	16.72	19.46
Per acre	1.870	1.850
Per ton	1.246	1.186
Cost of horse labor, at 13 cents per hour—		
Per day	$2.17	$2.53
Per acre	.243	.240
Per ton	.162	.154
Cost of man and horse labor:		
Per day	$3.84	$4.47
Per acre	.430	.425
Per ton	.286	.272

[a] 2,698 acres. [b] 1,411 acres. [c] 8.940 acres. [d] 10.510 acres. [e] 1.070 acres. [f] 1.080 acres.

TEDDING.

The tedder is used on over half of the farms in both States. The acreage tedded per hour averages 1.62 acres for the New York group and 1.28 for the Pennsylvania group. The average width of tedders used on the New York farms is 1.9 feet more than the average for those used by the Pennsylvania farms, which would account for the fact that 0.3 acre more work is done per hour in New York than in Pennsylvania. (See Table VII.)

The acreage of hay actually tedded per year is probably less than the figures would indicate, for when weather conditions are favorable it is not necessary to ted all of the hay unless the crop is heavy. On the farms using tedders, however, it was assumed in this study that all hay was tedded. The cost per ton for tedding is 19 cents for the New York group and 23 cents for the Pennsylvania group.

TABLE VII.—*Cost of tedding.*

Item.	52 farms in Steuben County, N. Y.	37 farms in Washington County, Pa.
Number of farms using tedder	29	21
Amount tedded per year (total tons)	[a] 2,191	[b] 1,444
Yield per acre (tons)	1.50	1.56
Width of tedder (feet)	8.76	6.85
Man labor:		
Hay tedded per day (tons)	[c] 18.10	[d] 19.75
Hay tedded per hour (tons)	[e] 2.43	[f] 1.99
Hours of labor—		
Per day	7.45	9.90
Per acre	.617	.782
Per ton	.441	.501

[a] 1,461 acres. [b] 926 acres. [c] 12.07 acres. [d] 12.66 acres. [e] 1.62 acres. [f] 1.28 acres

TABLE VII.—*Cost of tedding*—Continued.

Item.	52 farms in Steuben County, N. Y.	37 farms in Washington County, Pa.
Man labor—Continued.		
Cost of man labor, at 20 cents per hour—		
Per day	$1.49	$1.98
Per acre	.123	.156
Per ton	.082	.100
Horse labor:		
Hours of labor—		
Per day	14.90	19.80
Per acre	1.234	1.560
Per ton	.822	1.001
Cost of horse labor, at 13 cents per hour—		
Per day	$1.93	$2.57
Per acre	.160	.202
Per ton	.107	.130
Cost of man and horse labor:		
Per day	$3.42	$4.55
Per acre	.283	.358
Per ton	.189	.230

RAKING.

The common two-horse dump rake is generally used by the farmers of both groups. Both the side-delivery rake and side-delivery tedder are used to a certain extent. Neither bunching nor gleaning is practiced, except by a few farmers. (See Table VIII.)

Wider rakes, by 0.18 foot, are used in the New York farms than on the Pennsylvania farms. The amount of hay raked per hour is about 2.3 acres for New York and 2.0 acres for Pennsylvania. The cost of labor per ton for raking is 13 cents for New York and 15 cents for Pennsylvania.

The cost of raking is one factor in haymaking costs that can sometimes be reduced materially by using a boy to operate the rake.

TABLE VIII.—*Cost of raking.*

Item.	52 farms in Steuben County, N. Y.	37 farms in Washington County, Pa.
Number of farms using rake	52	37
Yield per acre (tons)	1.50	1.56
Width of rake (feet)	10.83	10.65
Man labor:		
Hay raked per day (tons)	[a] 25.95	[b] 24.42
Hay raked per hour (tons)	[c] 3.442	[d] 3.010
Hours of labor—		
Per day	7.54	8.11
Per acre	.436	.518
Per ton	.290	.332
Cost of man labor, at 20 cents per hour—		
Per day	$1.51	$1.62
Per acre	.087	.103
Per ton	.058	.066
Horse labor:		
Hours of labor—		
Per day	15.08	16.22
Per acre	.872	1.036
Per ton	.580	.664
Cost of horse labor, at 13 cents per hour—		
Per day	$1.96	$2.10
Per acre	.113	.134
Per ton	.075	.085
Cost of man and horse labor:		
Per day	$3.47	$3.72
Per acre	.200	.237
Per ton	.133	.151

[a] 17.30 acres. [b] 15.65 acres. [c] 2.295 acres. [d] 1.930 acres.

LOADING, HAULING, AND PUTTING HAY INTO THE BARN.

The crew most generally used in the New York area is one of four men and two horses. On the 52 New York farms there were found 30 four-man crews, 13 three-man crews, 7 two-man crews, 1 eight-man crew, and 1 six-man crew. Small crews do not as a rule keep any horse or team at the barn, the team used for hauling being also used for hoisting. (See figs. 1 and 2.)

In the cases of about half of the four-man crews one man remains at the barn to drive the team on the hay fork while unloading, and does nothing at other times. In such cases the fourth man is usually an old man or boy unable to work at loading. The four-man arrangement allows two men to work in the mow, enough to put the hay away in good shape.

FIG. 1.—Hay loader in operation. The loader saves time and puts hay on the wagon more cheaply than it can be pitched by hand.

When six, seven, or more men are used, there is a barn crew of from three to four who do all of the unloading, the driver unhitching from the load when reaching the barn and taking an empty wagon back to the field. The two-man crew allows one man to work in the mow and one to stick the hay fork and drive the hoisting team.

In the Pennsylvania area there were found 4 four-man crews, 27 three-man crews, 1 two-man crew, 3 seven-man crews, and 2 six-man crews. (See Table IX.)

The amount of hay handled per crew per hour is about 1.50 tons for the New York group and 1 for the Pennsylvania group, at a cost of 69 cents and 96 cents, respectively.

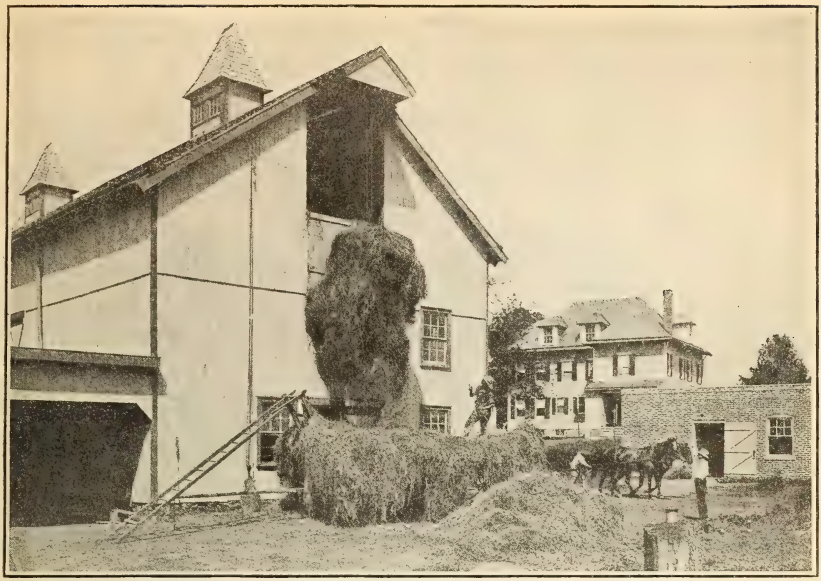

FIG. 2.—Unloading hay at the barn with horse power. This method is much more rapid than unloading by hand, and horses do the hard part of the work.

TABLE IX.—*Cost of bringing hay from the field and putting into barn.*

Item.	52 farms in Steuben County, N. Y.	37 farms in Washington County, Pa.
Amount produced per year (tons)	[a] 4,047	[b] 2,201
Yield per acre (tons)	1.50	1.56
Average number of men in crew	3.66	3.57
Man labor:		
Hay handled per day (tons)	[c] 11.970	[d] 9.375
Hay handled per hour (tons)	[e] 1.480	[f] 1.080
Hours of labor per day	8.09	8.67
Man hours—		
Per day	29.65	31.86
Per acre	3.715	5.300
Per ton	2.475	3.400
Cost of man labor, at 20 cents per hour—		
Per day	$5.93	$6.37
Per acre	.743	1.060
Per ton	.495	.680
Horse labor:		
Average number of horses used	2.23	2.27
Hours of horse labor—		
Per day	18.17	20.11
Per acre	2.275	3.346
Per ton	1.516	2.145
Cost of horse labor, at 13 cents per hour—		
Per day	$2.36	$2.61
Per acre	.295	.435
Per ton	.197	.279
Cost of man and horse labor:		
Per day	$8.29	$8.98
Per acre	1.038	1.495
Per ton	.692	.959

[a] 2,968 acres.
[b] 1,411 acres.
[c] 7.980 acres.
[d] 6.010 acres.
[e] 0.968 acre.
[f] 0.693 acre.

LENGTH OF WORKING DAY AND WORK ACCOMPLISHED.

The hours of labor and amount of work done for each of the haying operations on the farms studied is shown in Table X.

TABLE X.—*Hours of work per day and amount accomplished in hay-making operations.*

Operation.	52 farms in Steuben County, N. Y.					37 farms in Washington County, Pa.				
	Farms reporting each operation.	Hours worked per day per man.	Hours worked per day per horse.	Amount of hay handled per day.		Farms reporting each operation.	Hours worked per day per man.	Hours worked per day per horse.	Amount of hay handled per day.	
				Acres.	Tons.				Acres.	Tons.
Seeding by hand	30	9.43	.....	16.80	.....	37	10.00	.....	15.54	.....
Mowing	52	8.36	16.72	8.94	13.41	37	9.73	19.46	10.51	16.40
Tedding	29	7.45	14.90	12.07	18.10	21	9.90	19.80	12.66	19.75
Raking	52	7.54	15.08	17.30	25.95	37	8.11	16.22	15.65	24.42
Loading, hauling, and putting into barn	52	8.09	18.17	7.98	11.97	37	8.67	20.11	6.01	9.37

WORK ACCOMPLISHED PER HOUR.

The work accomplished per hour, under average conditions, is shown in Table XI. For all farms studied the average per hour for seeding is 1.66 acres; for mowing, 1.07 acres; for tedding, 1.45 acres; for raking, 2.65 acres; and for loading, hauling, and putting into the barn, 3.61 tons. The operation of loading, hauling, and putting into barn is performed by three men or four men, depending upon the length of haul and the adaptability and efficiency of the men.

Table XI may be of some assistance to those who wish to make plans for harvesting hay, acreage and length of working day being known:

TABLE XI.—*Amount of hay handled per hour.*

Operation.	52 farms in Steuben County, N. Y.						37 farms in Washington County, Pa.					
	Farms reporting each operation.	Width (feet).	Number of men.	Number of horses.	Acres.	Tons.	Farms reporting each operation.	Width (feet).	Number of men.	Number of horses.	Acres.	Tons.
Seeding	30	.....	1	.....	1.780	.....	37	.....	1	.....	1.550	.....
Mowing	52	5.14	1	2	1.070	1.604	37	5.92	1	2	1.080	1.685
Tedding	29	8.76	1	2	1.620	2.430	21	6.85	1	2	1.280	1.990
Raking	52	10.83	1	2	2.295	3.442	37	10.65	1	2	1.930	3.010
Loading, hauling, and putting into barn	52	.....	3.66	2.23	.968	1.480	37	.....	3.57	2.27	.693	1.080

AMOUNT OF LABOR REQUIRED PER ACRE AND PER TON.

The amount of labor required per acre and per ton on the farms studied is shown in Table XII:

TABLE XII.—*Labor required per acre and per ton for different operations.*

MEN.

Operation.	52 farms in Steuben County, N. Y.				37 farms in Washington County, Pa.			
	Farms reporting each operation.	Number of men.	Man-hours.		Farms reporting each operation.	Number of men.	Man-hours.	
			Per acre.	Per ton.			Per acre.	Per ton.
Seeding by hand [a]	30	1	0.561	.....	37	1	0.643	.....
Mowing	52	1	.935	0.622	37	1	.925	0.593
Tedding	29	1	.617	.441	21	1	.782	.501
Raking	52	1	.436	.290	37	1	.518	.332
Loading, unloading and putting into barn	52	3.66	3.715	2.475	37	3.57	5.300	3.400
Total	.....	.....	6.264	4.202	.....	.....	8.168	5.238

[a] Actual amount of labor required to seed an acre and not prorated for life of meadow.

HORSES.

Operation.	Farms reporting each operation.	Number of horses.	Horse-hours.		Farms reporting each operation.	Number of horses.	Horse-hours.	
			Per acre.	Per ton.			Per acre.	Per ton.
Mowing	52	2	1.870	1.246	37	2	1.850	1.186
Tedding	29	2	1.234	.882	21	2	1.560	1.001
Raking	52	2	.872	.580	37	2	1.036	.664
Loading, unloading, and putting into barn	52	2.23	2.275	1.516	37	2.27	3.346	2.145
Total	.....	.....	6.251	4.224	.....	.....	7.792	4.996

COMPARISON OF LABOR COSTS FOR DIFFERENT OPERATIONS.

The cost of man and horse labor for the different operations is shown in Table XIII. The total labor cost per ton for the New York group is $1.31, and for the Pennsylvania group, $1.63. The difference in cost is due almost entirely to the cost of loading, hauling, and putting into the barn, which is 32 cents higher in Pennsylvania than in New York. The costs for other operations show only very slight differences.

TABLE XIII.—*Cost of man labor and of horse labor per acre and per ton for different operations.*

MAN LABOR.

Operation.	52 farms in Steuben County, N. Y.			37 farms in Washington County, Pa.		
	Farms.	Cost.		Farms.	Cost.	
		Per acre.	Per ton.		Per acre.	Per ton.
Seeding by hand [a]	30	$0.030	$0.020	37	$0.031	$0.020
Mowing	52	.187	.124	37	.185	.118
Tedding	29	.123	.082	21	.156	.100
Raking	52	.087	.058	37	.103	.066
Loading, unloading, and putting into the barn	52	.743	.495	37	1.060	.680
Total		1.170	.779		1,535	.984

[a] Cost during life of meadow.

HORSE LABOR.

Mowing	52	$0.243	$0.162	37	$0.240	$0.154
Tedding	29	.160	.107	21	.202	.130
Raking	52	.113	.075	37	.134	.085
Loading, hauling, and putting into barn	52	.295	.197	37	.435	.279
Total		.811	.541		1.011	.648
Cost of man and horse labor		1.981	1.310		2.546	1.632

MACHINERY CHARGES.

Haying machinery is used but a few days per year on these farms. When ordinary care is used in operating machinery, the cost of repairs is but a small portion of the total cost of production. Machinery charges include repairs, interest, and depreciation or replacement, but not the value of labor in making repairs, regarding which it was not possible to get accurate data. However, this item is not important.

Interest on machinery, in most cases, equals the cost of repairs. It has been figured at 5 per cent, which is the prevailing rate in each region. (See Table XIV.)

TABLE XIV.—*Repairs, interest, and depreciation on hay machinery.*

REPAIRS.

Kind of machine.	52 farms in Steuben County, N. Y.						37 farms in Washington County, Pa.					
	Farms reporting.	Cost.					Farms reporting.	Cost.				
		Per day used.	Per year.	Total for life.	Per acre.	Per ton.		Per day used.	Per year.	Total for life.	Per acre.	Per ton.
Seeders	30											
Mowers	52	$0.295	$1.52	$16.19	$0.033	$0.022	37	$0.328	$1.190	$17.20	$0.031	$0.020
Tedders	29	.148	.60	10.24	.012	.008	21	.140	.488	11.84	.011	.007
Rakes	52	.226	.64	11.26	.013	.008	37	.118	.289	7.28	.007	.004

TABLE XIV.—*Repairs, interest, and depreciation on hay machinery*—Continued.

INTEREST.

Kind of machine.	52 farms in Steuben County, N. Y.						37 farms in Washington County, Pa.					
	Farms reporting.	Cost.					Farms reporting.	Cost.				
		Per day used.	Per year.	Total for life.	Per acre.	Per ton.		Per day used.	Per year.	Total for life.	Per acre.	Par ton.
Hand seeders	17	$0.058	$0.052	$1.02	$0.004	$0.003	11	$0.091	$0.051	$1.05	$0.006	$0.004
Wheelbarrow seeders	13	.340	.271	4.75	.019	.012						
Mowers	52	.235	1.200	12.78	.027	.018	37	.315	1.141	16.51	.030	.019
Tedders	29	.204	.819	14.07	.017	.011	21	.226	.784	19.03	.017	.011
Rakes	52	.222	.629	11.08	.013	.008	37	.310	.757	19.07	.019	.012

REPAIRS, INTEREST, AND DEPRECIATION.

Hand seeders	17	$0.172	$0.155	$3.02	$0.011	$0.007	11	$0.262	$0.146	$3.00	$0.017	$0.011
Wheelbarrow seeders	13	1.078	.86	15.05	.061	.040						
Mowers	52	1.330	6.83	72.83	.148	.099	37	1.450	5.280	76.46	.138	.088
Tedders	29	.805	3.25	55.45	.066	.044	21	.711	2.470	61.02	.056	.036
Rakes	52	.927	2.62	46.20	.053	.035	37	.903	2.200	55.48	.057	.037

WORK DONE BY MACHINERY.

Table XV shows the amount of work done by machinery in acres and in tons per day, per year, and during its life. On the Pennsylvania farms, mowers, tedders, and rakes cover a greater acreage during life than they do on the New York farms.

TABLE XV.—*Service rendered by machinery.*

52 FARMS IN STEUBEN COUNTY, N. Y.

Kind of machine.	Farms reporting.	Width of machine.	Amount of hay handled.					
			Per day.		Per year.		Total during life.	
			Acres.	Tons.	Acres.	Tons.	Acres.	Tons.
		Feet.						
Hand seeders	17		15.53		13.99		271.20	406.80
Wheelbarrow seeders	13		17.69	26.53	14.11	21.16	247.00	370.50
Mowers	52	5.14	8.94	13.41	46.10	69.15	490.00	735.00
Tedders	29	8.76	12.07	18.10	48.65	82.97	831.00	1,247.00
Rakes	52	10.82	17.30	25.95	49.00	73.50	862.00	1,293.60

37 FARMS IN WASHINGTON COUNTY, PA.

Hand seeders	11		15.00		8.37		171.00	273.20
Wheelbarrow seeders								
Mowers	37	5.92	10.51	16.40	38.13	59.50	551.00	859.50
Tedders	21	6.85	12.66	19.75	44.10	68.80	1,070.00	1,670.00
Rakes	37	10.65	15.65	24.42	38.14	59.50	961.00	1,498.00

LIFE OF MACHINERY.

Table XVI shows the service rendered by machinery in days used, per year and for its life. Mowers are used about the same number of days in each region. Tedders are used 16 more days and rakes

11 more days on the Pennsylvania farms than on the New York farms. All haying machinery is well taken care of in both sections. The practice of allowing machinery to stand out of doors, customary in some parts of the middle west, is not common in the east.

TABLE XVI.—*Life of machinery and number of days used.*

Kind of machine.	52 farms in Steuben County, N. Y.				37 farms in Washington County, Pa.			
	Farms reporting.	Days used per year.	Years' service.	Days used during life.	Farms reporting.	Days used per year.	Years' service.	Days used during life.
Hand seeders	17	0.904	19.40	17.52	11	0.557	20.25	11.45
Wheelbarrow seeders	13	.797	17.50	13.96				
Mowers	52	5.150	10.65	54.80	37	3.620	14.46	52.42
Tedders	29	4.030	17.07	68.85	21	3.486	24.28	84.50
Rakes	52	2.830	17.60	49.80	37	2.430	25.20	61.40

In Table XVII are shown comparative figures on interest and taxes on hay land for the two regions:

TABLE XVII.—*Interest and taxes on hay land.*

Item.	52 farms in Steuben County, N. Y.		37 farms in Washington County, Pa.	
	Per acre.	Per ton.	Per acre.	Per ton.
Average value of entire farm	$55.35		$72.84	
Average value of hay land	80.10		105.40	
Interest on hay land at 5 per cent	4.00	$2.670	5.27	$3.380
Taxes on hay land	.801	.534	1.054	.675
Interest and taxes	4.801	3.204	6.324	4.055

TOTAL COST OF PRODUCING HAY.

In Table XVIII is given a summary of the cost of all labor, of machinery charges, seed cost, taxes, and interest on hay land. This amounts to $5 per ton for the New York farms and $6.10 for the Pennsylvania farms. This cost is obtained by prorating the cost of seeding, tedding, etc., to cover the total hay area surveyed in each section.[1]

Table XIX presents the cost of producing hay on farms where there is a charge for seeding and tedding. The cost of these operations, machinery charges, seed cost, taxes, and interest on land, amount to $7.704 per acre and $5.154 per ton for the New York and $9.673 per acre and $6.202 per ton for the Pennsylvania group.

On farms where hay is not seeded with a grain crop, but where the seed bed is prepared especially, there will be an additional labor charge of perhaps from 75 cents to $1 per acre per year, depending upon the life of the meadow.

[1] Commercial fertilizers are used very little in the areas studied, and not at all on the hay crop. Hence there is no charge for fertilizers.

TABLE XVIII.—*Cost of man and horse labor, repairs, interest, and depreciation on machinery for haying operations.*

Operation.	52 farms in Steuben County, N. Y.				37 farms in Washington County, Pa.			
	Farms reporting each operation.	Cost.			Farms reporting each operation.	Cost.		
		Per day.	Per acre.	Per ton.		Per day.	Per acre.	Per ton.
Seeding with hand seeder	17	$2.052	$0.041	$0.027	11	$2.26	$0.048	$0.031
Seeding with wheelbarrow seeder	13	2.958	.091	.060				
Average for seeding	30	2.553	.065	.042	11	2.26	.048	.031
Mowing	52	5.170	.578	.385	37	5.920	.563	.360
Tedding	29	4.225	.349	.233	21	5.261	.414	.266
Raking	52	4.397	.253	.168	37	4.623	.294	.188
Loading, hauling, and putting into barn	52	8.290	1.038	.692	37	8.980	1.495	.959
Total for all operations		24.635	2.283	1.520		27.024	2.814	1.804

TABLE XIX.—*Actual cost of producing 4,047 tons of hay on 52 farms in Steuben County, N. Y., and 2,201 tons on 37 farms in Washington County, Pa.*

Item of cost.	Cost of man and horse labor, repairs, interest, and depreciation on machinery.			
	52 farms in Steuben County, N. Y.		37 farms in Washington County, Pa.	
	Per acre.	Per ton.	Per acre.	Per ton.
Preparing seed bed				
Seeding	$0.031	$0.021	$0.035	$0.022
Mowing	.578	.385	.563	.360
Tedding	.181	.121	.270	.173
Raking	.253	.168	.294	.188
Loading, hauling, and putting into barn	1.038	.692	1.495	.959
Repairs, interest, and depreciation on hay loaders	.012	.008		
	2.093	1.395	2.657	1.702
Seed	.620	.430	.533	.343
Taxes and 5 per cent of hay land	4.801	3.204	6.324	4.055
Total	7.514	5.002	9.516	6.100

COST OF BALING HAY.

Only a small per cent of the hay producers in the areas surveyed own their own hay presses. Most of the market hay is baled by the country buyer and shipper, or else by custom balers. The customary price for baling is $1.50 per ton, and often the hay grower is expected to furnish one or two pitchers and board the press crew of three or four men. With the ordinary crew this brings the cost of pressing up to about $2 per ton.[1]

COST OF HAULING TO MARKET.

It is almost impossible to determine the average cost of hauling hay to market without making special time studies, since hay is marketed in quantities varying from a ton to a carload. This operation is usually performed by farm man labor and horse labor, and not by those making a business of hauling, as is the case in the Middle West, where hay is grown on a more extensive scale. The

[1] Considerable information secured in this study on the management of baling crews and the cost of baling will be published in other bulletins.

condition of the roads has a decided influence on the cost, as bad roads make it impossible to haul a full load and necessitate a longer time per trip.

From the report of 25 farmers in the New York area it was found that the average distance to market was 3 miles and the cost of hauling 70 cents per ton.

TABLE XX.—*Labor cost per ton when the yield varies. (52 farms in Steuben County, N. Y.)*

Operation.	Labor cost per ton when yield is—		
	3 tons per acre.	1.50 tons per acre.	1 ton per acre.
Seeding	$0.021	$0.042	$0.063
Mowing	.192	.385	.577
Tedding	.116	.233	.349
Raking	.084	.168	.252
Loading, hauling, and unloading	.692	.692	.692
Total	1.105	1.520	1.933

FIG. 3.—A good stand of timothy and clover, yielding over two tons per acre. The cost of production decreases and profits increase as the yield per acre increases.

EFFECT OF YIELD ON THE COST OF LABOR PER TON.

The cost of labor per ton is directly affected by yield in seeding, mowing, tedding, and raking, since the amount of work accomplished per hour in these operations is nearly the same for a light yield as for a heavy one. Even the cost of loading by hand, hauling, and putting into the barn is but slightly affected by variation in yield.

For the purpose of illustrating the effect of yield upon labor cost per ton Table XX has been prepared, based on the cost in the New York area, where the yield is 1.50 tons per acre. It will be seen that the labor cost per ton decreases as the yield increases, the cost with a 1-ton yield being almost double the cost with a 3-ton yield. (See fig. 3.)

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